The application of new optical meteor flux routines to the 2014 May Camelopardalid outburst

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NASA's Meteoroid Environment Office (MEO) is charged with monitoring the meteoroid environment in near-Earth space for the protection of satellites and spacecraft. The MEO has recently established eight wide-field meteor cameras, four cameras each at two separate stations to calculate automated meteor fluxes in the millimeter size range. Each camera consists of a 17 mm focal length Schneider lens on a Watec 902H2 Ultimate CCD video camera, producing a 21.7 x 15.5 degree field of view. This configuration has a limiting meteor magnitude of about +5. One station is located at Marshall Space Flight Center in Huntsville, Alabama and the other is 31.8 kilometers away at a school in Decatur, Alabama. Both single-station and double-station fluxes are calculated every morning using data from the previous night.

The flux algorithms employed here differ from others currently in use in that they do not assume a single height for all meteors observed in the common camera volume. In the MEO system, the volume is broken up into a set of height intervals, with the collecting areas determined by the position of the active shower or sporadic source radiant. The flux per height interval is calculated and summed to obtain the total meteor flux. As the mass is also computed from the photometry, a mass flux can also be calculated.

First, a weather algorithm indicates if sky conditions are clear enough to calculate fluxes, at which point a limiting magnitude algorithm is employed. The limiting magnitude algorithm performs a fit of stellar magnitudes versus camera intensities. The stellar limiting magnitude is derived from this and converted to a limiting meteor magnitude for the active shower or sporadic source. The fluxes are scaled to an average limiting magnitude throughout the night and zenithal hourly rate (ZHR's) are output daily along with flux values.

In addition to this process, results will be presented as applied to the 2014 May Camelopardalid outburst, using data from several different optical systems, which looked at May Camelopardalids in different size ranges.